

CITY OF FALLS CHURCH, VIRGINIA

Chesapeake Bay TMDL Action Plan

In compliance with General Permit for Discharges of Stormwater from Small Municipal Storm Sewer Systems VAR040065



Public Review Draft – July 27, 2015



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City of Falls Church, Virginia

Chesapeake Bay TMDL Action Plan

July 27, 2015

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City of Falls Church, Virginia Chesapeake Bay TMDL Action Plan

July 27, 2015

1. Introduction

1.1 Purpose

This Chesapeake Bay TMDL Action Plan documents how the City of Falls Church intends to meet the “Special Condition for the Chesapeake Bay TMDL” in Section I, Part C of the City’s General Permit for Discharges from Small Municipal Separate Storm Sewer Systems (MS4s). The City’s most recent permit (VAR040065) was issued by the Virginia Department of Environmental Quality (DEQ) effective July 1, 2013 and will expire June 30, 2018.

The City’s MS4 permit requires the development and implementation of action plans for impaired streams where a Total Maximum Daily Load (TMDL) assigns a waste load allocation (WLA) to the City that has been approved by the State Water Control Board. A TMDL establishes the maximum amount of a pollutant that can enter a water body without violating water quality standards.

A TMDL for the Chesapeake Bay was established by the U.S. Environmental Protection Agency in 2010. Pollutants of concern (POCs) identified for the Chesapeake Bay include total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS). Virginia subsequently developed and adopted a Watershed Implementation Plan (WIP) that establishes the basic framework for meeting the Chesapeake Bay TMDL. The Virginia WIP commits MS4 permit holders to a phased approach for meeting required reductions over three five-year permit cycles in accordance with the following: 5% of required reductions by the end of the first permit cycle (June 30, 2018); a total of 40% of required reductions by the end of the second permit cycle; and, 100% of required reductions by the end of the third permit cycle.

This Chesapeake Bay TMDL Action Plan calculates the 5% reduction target and establishes the means and methods for achieving the reduction target in accordance with the MS4 permit and the final Chesapeake Bay TMDL Special Condition Guidance developed by DEQ (Guidance Memo No 14-2012) dated May 18, 2015. Reductions in excess of 5% will be applied to the second permit cycle requirements.

1.2 Summary of Required Reductions and Means and Methods to Achieve Required Reductions

In accordance with the MS4 permit, the City must calculate reductions required from existing sources as of June 30, 2009 (Section 4) and then calculate offsets to account for increases in pollutant loads due to new sources initiating construction between July 1, 2009 and June 30, 2014 (Section 6) and grandfathered projects beginning construction after July 1, 2014 (Section 7). The City must then identify the means and methods to achieve the required POC reductions accordingly.

The City calculates that the following reductions must be achieved from existing sources as of June 30, 2009: 66.1 pounds for TN; 8.7 pounds for TP; and, 7,466.1 pounds for TSS. The City will achieve the reductions through the means and methods detailed in Section 5. Means and methods include redevelopment that resulted in a decrease in pollutant loads (Section 5.1) and City-initiated stormwater management and stream restoration projects (Section 5.2). These practices are anticipated to result in the following POC reductions: 174.75 pounds for TN; 135.02 pounds for TP; and, 66,485.65 pounds for TSS. These practices exceed required reductions from existing sources.

The City may also take credit for additional reductions, which will be documented in the City's annual reports to DEQ. These include additional redevelopment and City-initiated projects, credit for street sweeping operations (Section 5.3), more stringent regulation of single family residential structures under one acre (Section 5.4), nutrient credit trading (Section 5.5), eligible stormwater management facilities installed between January 1, 2006 and June 30, 2009 (Section 5.6), and additional means and methods that may be implemented in accordance with DEQ's Chesapeake Bay TMDL Special Conditions Guidance (Section 5.7).

During the period of July 1, 2009 through June 30, 2014, 12 development projects resulted in a land disturbance of one acre or greater. However, all of these projects were redevelopment projects and resulted in a reduction in POC loads. In addition, the City has no grandfathered projects initiating construction after July 1, 2014. As a result, no offsets for new or grandfathered sources are required for this permit cycle.

Table 1A– Summary of Required Reductions and Means and Methods to Achieve Required Reductions

	Total Nitrogen (lbs)	Total Phosphorus (lbs)	Total Suspended Solids (lbs)
Required Reductions from Existing Sources	66.1	8.7	7,466.1
- Means and Methods from Section 5	174.75	135.02	66,485.65
= Excess Credit from Existing Sources	108.65	126.32	59,019.55
Required New Source Offsets	0	0	0
- Excess Credit from Existing Sources	108.65	126.32	59,019.55
Remaining Excess Credit After Accounting for New Source Offsets	108.65	126.32	59,019.55
Required Grandfathered Offsets	0	0	0
Remaining Excess Credit Carried Over to Next Permit Cycle	108.65	126.32	59,019.55

1.3 Permit Compliance Crosswalk

Table 1B provides each of the requirements of the City’s MS4 permit and the specific section where the requirement is addressed in this Chesapeake Bay TMDL Action Plan.

Table 1B – Action Plan and Permit Compliance Crosswalk

Falls Church Action Plan Section	Element from DEQ TMDL Special Condition Guidance	MS4 Permit	MS4 Permit Requirement
Section 2.1	Part VI.1 – Current Program and Existing Legal Authority	Section I.C.2.a(1)	A review of the current MS4 program implemented as a requirement of this state permit including a review of the existing legal authorities and the operator’s ability to ensure compliance with this special condition.
Section 2.2	Part VI.2 – New or Modified Legal Authority	Section I.C.2.a(2)	The identification of any new or modified legal authorities such as ordinances, state and other permits, orders, specific contract language, and inter-jurisdictional agreements implemented or needing to be implemented to meet the requirements of this special condition.
Section 3	Part VI.3 – Means and Methods to Address Discharges from New Sources	Section I.C.2.a(3)	The means and methods that will be utilized to address discharges into the MS4 from new sources.
Section 4	Part VI.4 – Estimated Existing Source Loads and Calculated Total Pollutants of Concern (POC) Required Reductions	Section I.C.2.a(4) and Section I.C.2.a(5)	An estimate of the annual POC loads discharged from the existing sources as of June 30, 2009, based on the 2009 progress run. The operator shall utilize the applicable versions of Tables 2 a-d in this section based on the river basin to which the MS4 discharges by multiplying the total existing acres served by the MS4 on June 30, 2009 and the 2009 Edge of Stream (EOS) loading rate. A determination of the total pollutant load reductions necessary to reduce the annual POC loads from existing sources utilizing the applicable versions of Tables 3 a-d in this section based on the river basin to which the MS4 discharges. This shall be calculated by multiplying the total existing acres served by the MS4 by the first permit cycle required reduction in loading rate. For the purpose of this determination, the operator shall utilize those existing acres identified by the 2000

Falls Church Action Plan Section	Element from DEQ TMDL Special Condition Guidance	MS4 Permit	MS4 Permit Requirement
			U.S. Census Bureau urbanized area and served by the MS4.
Section 5	Part VI.5 – Means and Methods to Meet the Required Reductions and Schedule	Section I.C.2.a(6)	The means and methods, such as best management practices and retrofit programs that will be utilized to meet the required reductions included in subdivision 2.a(5) of this subsection, and a schedule to achieve those reductions. The schedule should include annual benchmarks to demonstrate the ongoing progress in meeting those reductions.
Section 6	Part VI.6 – Means and Methods to Offset Increased Loads from New Sources Initiating Construction between July 1, 2009 and June 30, 2014	Section I.C.2.a(7)	The means and methods to offset the increased loads from new sources initiating construction between July 1, 2009 and June 30, 2014 that disturb one acre or greater as a result of the utilization of an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids. The operator shall offset 5.0% of the calculated increased load from these new sources during the permit cycle.
Section 7	Part VI.7 – Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction after July 1, 2014	Section I.C.2.a(8)	The means and methods to offset the increased loads from projects as grandfathered in accordance with 4VAC50-60-48 that disturb one acre or greater that begin construction after July 1, 2014, where the project utilizes an average land cover condition greater than 16% impervious cover in the design of post-development stormwater management facilities. The operator shall utilize Table 4 in this section to develop the equivalent pollutant load for nitrogen and total suspended solids.
Section 8	Part VI.8 – List of Future Projects, and Associated Acreage that Qualify as Grandfathered	Section I.C.2.a(10)	A list of future projects and associated acreage that qualify as grandfathered in accordance with 4VAC50-60-48.
Section 9	Part VI.9 – Estimated Expected Cost to	Section I.C.2.a(11)	An estimate of the expected costs to implement the requirements of this

Falls Church Action Plan Section	Element from DEQ TMDL Special Condition Guidance	MS4 Permit	MS4 Permit Requirement
	Implement Necessary Reductions		special condition during the state permit cycle.
Section 10	Part VI.10a&b – Public Comments on Draft Action Plan	Section I.C.2.a(12)	An opportunity for receipt and consideration of public comment regarding the draft Chesapeake Bay TMDL Action Plan. A list of all comments received as a result of public comment and any modifications made to the draft Chesapeake Bay TMDL Action Plan as a result of the public comments.

2. Current Program and Legal Authority

2.1 MS4 Program Description and Existing Legal Authority

The City has adopted an MS4 Program Plan that documents implementation of all MS4 permit requirements, including the programmatic and legal authorities required to meet the “Special Condition for the Chesapeake Bay TMDL.” The full MS4 Program Plan can be found at <http://www.fallschurchva.gov/261/Municipal-Separate-Storm-Sewer-System-MS>. Table 2A provides a summary of the six minimum control measures (MCMs) implemented by the City under the MS4 permit and how they relate to controlling total nitrogen, total phosphorus, and total suspended solids.

Table 2A – MS4 Program Plan Components Related to Meeting the Chesapeake Bay TMDL

Minimum Control Measure	MS4 Program Plan Elements Related to Controlling Total Nitrogen, Total Phosphorus, and Total Suspended Solids
Public Education and Outreach on Stormwater Impacts	The City’s public education and outreach program includes several actions designed to reduce sediment and nutrients. These include: <ul style="list-style-type: none"> • BMP 1A. Each year, draft and publish at least three stormwater management articles in the Falls Church News-Press with at least one article encouraging stormwater retrofits. • BMP 1B. Each year, draft and publish stormwater management articles in the Watershed News section of Department of Public Works online newsletter with a focus on demonstrating how residents can take steps to improve water quality at home.
Public Involvement and Participation	The City has designed a program to involve the public in the decision-making process. In particular, BMP 2E promotes the Village Preservation and Improvement Society Neighborhood Tree Program planting events. Tree planting has the potential to reduce sediment and nutrients.
Illicit Discharge Detection and Elimination	The City has designed a program to identify and eliminate illicit discharges. Actions that specifically address sediment and nutrients include the following:

Minimum Control Measure	MS4 Program Plan Elements Related to Controlling Total Nitrogen, Total Phosphorus, and Total Suspended Solids
	<ul style="list-style-type: none"> • BMP 3A. Promote, publicize, and facilitate public reporting of illicit discharges. Illicit discharges may include sediment from construction activities or nutrients from landscaping and other activities. • BMP 3E. Develop targeted outreach materials for industries located in the City of Falls Church that are particularly susceptible to illicit discharges to the storm sewer system.
Construction Site Stormwater Runoff Control	The City’s construction site stormwater runoff control program is designed to be fully consistent with the water quality control requirements of the Virginia Erosion and Sediment Control Act and the Virginia Stormwater Management Act, and their attendant regulations.
Post-Construction Stormwater Management	The City’s construction site stormwater runoff control program is designed to be fully consistent with the water quality control requirements of the Virginia Stormwater Management Act and its attendant regulations.
Pollution Prevention and Good Housekeeping for Municipal Operations	<p>The City has included in its MS4 Program Plan actions to meet the pollution prevention and good housekeeping requirements for municipal operations. Actions that specifically address sediment and nutrients include the following:</p> <ul style="list-style-type: none"> • BMP 6A: Conduct street sweeping for City streets to remove potential pollutants. These pollutants include sediment and nutrients. • BMP 6B: Incorporate stormwater quality management information into ongoing employee training/safety programs. This information will include how to prevent sediment and nutrient pollution. • BMP 6C and BMP 6D: Identify high-priority, City-owned and operated facilities with a specific emphasis on illicit discharges. Develop and implement a stormwater pollution prevention plan (SWPPP) for high-priority, City-owned and operated facilities. Both of these actions will evaluate whether City operations are a source of sediment and nutrients and result in plans to control these pollutants. • BMP 6E and BMP 6F: Identify City-owned and operated facilities requiring nutrient management plans. Develop and implement a nutrient management plan for sites identified in BMP 6E.

2.2 New or Modified Legal Authority

After review of the City’s existing MS4 Program Plan and legal authorities, the City finds that no additional legal authorities are required for compliance with the “Special Condition for the Chesapeake Bay TMDL.”

3. Means and Methods to Address Discharges from New Sources

The City must identify and implement the means and methods necessary to address discharges into the MS4 from new sources. Any new source that disturbs one acre or greater and utilizes an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities must be offset in accordance with Section I.C.2.a(3) of the permit. Between July 1, 2009 and June 30, 2014, the City utilized a 35% cap on impervious cover for single family home new development and redevelopment (approximately 1.5 pounds of phosphorus per acre per year). For all other development, if the impervious coverage was 50% or less, then the development had to meet the existing pollutant load. For development over 50% impervious cover, the existing pollutant load had to be reduced by 10%. Section 6 addresses the issue of offsets to address discharges from new sources.

On March 24, 2014, the City Council adopted stringent new stormwater quality requirements (Chapter 35, Article I “Stormwater Management” City of Falls Church Code) that meet or exceed the state’s minimum requirements for discharges from new sources. These changes became effective July 1, 2014 and meet the requirements of the Virginia Stormwater Management Act (§62.1-44.15:24 et seq, Code of Virginia), the Erosion and Sediment Control Act (§62.1-44.15:51 et seq, Code of Virginia), the Chesapeake Bay Preservation Act (§62.1-44.15:67 et seq, Code of Virginia), and their attendant regulations.

The City’s ordinance applies to any land-disturbing activity 2,500 square feet and greater, which is the threshold required under the Virginia Stormwater Management Regulations (9VAC25-870) for localities subject to the Chesapeake Bay Preservation Act. However, the City’s requirements are more stringent than the minimum standards since it could have exempted single family residential development not part of a common plan of development under one acre. All new development, and all new development and redevelopment that is zoned as low and medium residential, must meet a standard of 0.41 pounds of phosphorus per acre per year. All redevelopment, except parcels zoned or classified as low and medium residential, must reduce the phosphorus load by 20% if the land disturbance is one acre or greater or by 10% if the land disturbance is less than one acre (not to exceed the 0.41 standard for new development). The standard of 0.41 pounds of phosphorus per acre per year is mandated by the Virginia Stormwater Management Regulations, and according to DEQ, meets the requirement for no-net-increase from new sources.

A full copy of the City’s stormwater management ordinance can be found at the following website:
<http://www.fallschurchva.gov/173/Stormwater>.

4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern (POC) Required Reductions

The following sections describe the methodology used by the City to estimate existing POC source loads. In accordance with the MS4 permit, the City must estimate the annual POC loads discharged from existing sources as of June 30, 2009 based on the 2009 progress run. Completed calculation tables from the permit are included in Table 4A.

4.1 MS4 Service Area Delineation Methodology

Storm sewer system GIS data (including MS4 outfalls) were used in conjunction with hydrologic features, local topographic data, and high-resolution aerial photos taken in March 2009 to delineate the City’s MS4 boundary and create an MS4 boundary polygon layer. Drainage features were thoroughly reviewed by engineers and planners using a GIS environment to

accurately account for storm sewer drainage areas and determine break points between the manmade and natural hydrologic systems.

Sheet flow crossing the City boundary was also considered and analyzed. Sheet flow between MS4s is accounted for in accordance with Appendix IV of DEQ's Chesapeake Bay TMDL Special Condition Guidance. With the exception of small areas adjacent to two natural stream valleys (Four Mile Run and Tripps Run) and areas sheet flowing to adjoining localities, the vast majority of the City's total land area consists of regulated impervious and pervious cover.

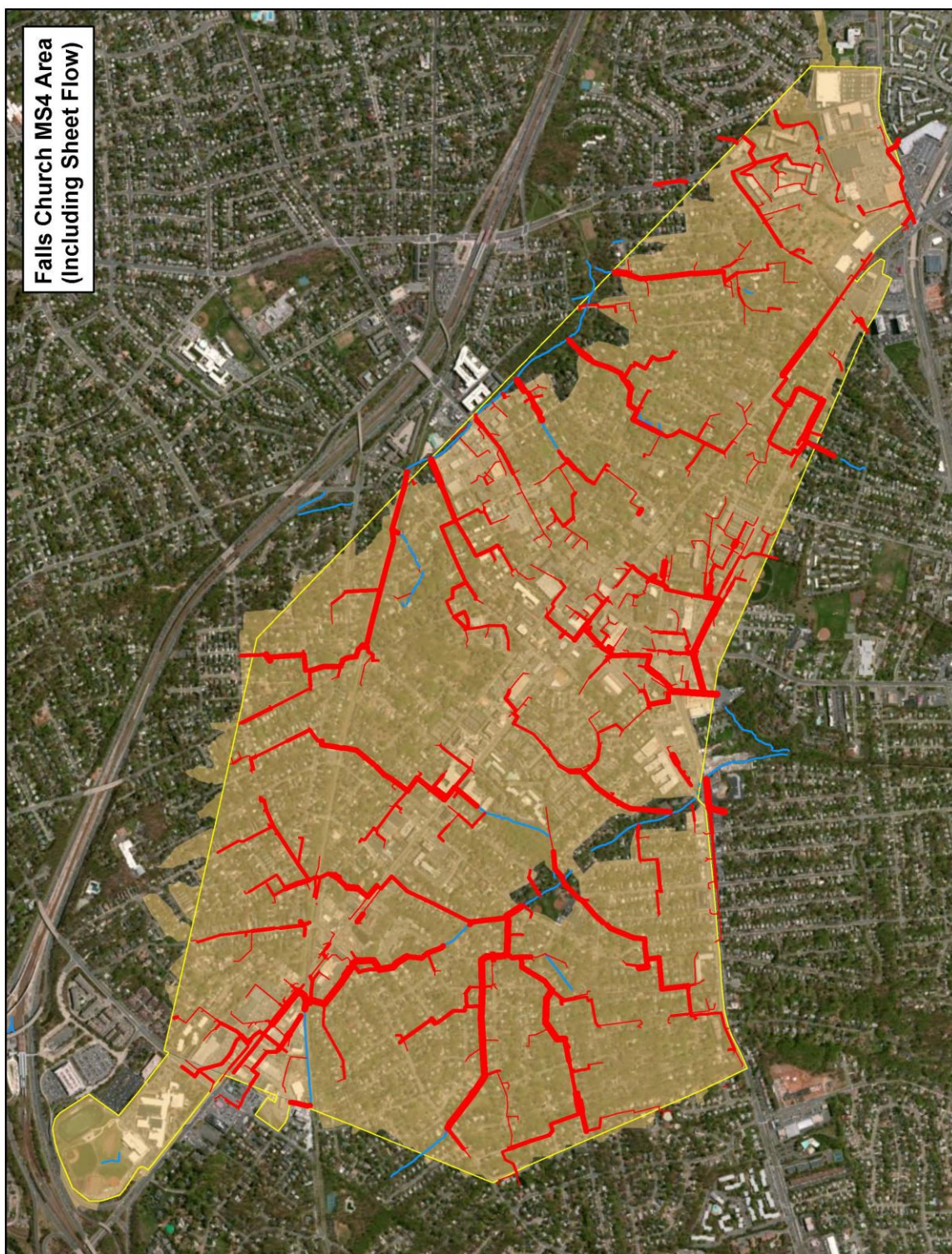
In accordance with DEQ's Chesapeake Bay TMDL Special Guidance, the City may exclude from its MS4 service area land regulated under any general VPDES permit that addresses industrial stormwater and forested land one half contiguous acre or more that meets specific criteria. The City has not identified within its boundary any property with a VPDES industrial stormwater permit. The City conducted a preliminary analysis of potential forested area within the MS4 and determined that the amount is *de minimus*. As a result, the City has opted not to exclude these areas for this plan, but may choose to conduct the additional analysis at a later date.

4.2 Pervious and Impervious Surface Delineation Methodology

A GIS approach was used to determine the City's regulated urban impervious and regulated urban pervious acres. Planimetric impervious cover GIS data was developed by the City of Falls Church from 2009 aerial imagery. This impervious cover dataset contains the entire City as well as areas immediately adjacent in Fairfax County and Arlington County. Impervious cover surfaces include buildings, roads, parking lots, sidewalks, recreational surfaces, and other similar features.

To calculate the 2009 impervious regulated area, the 2009 planimetric impervious cover features were clipped using the MS4 boundary polygon layer and the resulting acres were totaled. Regulated pervious acres were calculated by subtracting the regulated impervious acres from the total MS4 acres.

Map 4A – City of Falls Church MS4 Service Area Delineation



4.3 Estimated Existing Source Loads

The City must estimate the total existing source loads for total nitrogen, total phosphorus, and total suspended solids as of June 30, 2009 based on the 2009 Chesapeake Bay Model progress run and using 2009 Edge of Stream (EOS) loading rates.¹ The City has a total of 1,296.4 acres served by the MS4. It is noted that a boundary adjustment was approved between the City and Fairfax County in 2014. The adjustment resulted in an expansion of the City's regulated MS4 area, including parcels containing George Mason High School and Mary Ellen Henderson Middle School. Since these parcels have long been within Fairfax County's MS4 service area, they are now included in the City's existing source load.

Table 4A presents the estimated existing source loads in accordance with the MS4 permit and the Chesapeake Bay TMDL Special Conditions Guidance.

Table 4A – Estimated Existing Source Loads

Source	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	2009 EOS Loading Rate (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run	
Regulated Urban Impervious	Nitrogen	591.1	16.86	9,966	17,068
Regulated Urban Pervious		705.3	10.07	7,102	
Regulated Urban Impervious	Phosphorus	591.1	1.62	958	1,247
Regulated Urban Pervious		705.3	0.41	289	
Regulated Urban Impervious	Total Suspended Solids	591.1	1,171.32	692,372	816,357
Regulated Urban Pervious		705.3	175.8	123,985	

¹ Since the City is within the Potomac River watershed, the 2009 EOS loading rates from Table 2b of the permit must be utilized.

4.4 Required Reductions from Existing Source Loads

Table 4B shows the required reductions that must be achieved from the existing source loads calculated in Table 4A.²

Table 4B – Required Reductions from Estimated Existing Source Loads

Source	Pollutant	Total Existing Acres Served by MS4 (6/30/09)	First Permit Cycle required Reduction in Loading Rate (lbs/acre)	Total Reduction Required First Permit Cycle (lbs)	
Regulated Urban Impervious	Nitrogen	591.1	0.07587	44.8	66.1
Regulated Urban Pervious		705.3	0.03021	21.3	
Regulated Urban Impervious	Phosphorus	591.1	0.01296	7.7	8.7
Regulated Urban Pervious		705.3	0.00148625	1.0	
Regulated Urban Impervious	Total Suspended Solids	591.1	11.7132	6,923.7	7,466.1
Regulated Urban Pervious		705.3	0.769125	542.4	

4.5 Anticipated Future Reductions

The City is only required to achieve reductions identified in the current permit. However, it is anticipated that additional reductions will be required in accordance with the Virginia WIP. While these targets may change based on revisions to the Chesapeake Bay model and the WIP, the current targets are summarized in Table 4C for planning purposes.

² Reductions from estimated existing source loads are calculated using Table 3b of the permit.

Table 4C – Estimated Total Reductions by Permit Cycle

Pollutant	First Permit Cycle (lbs)	Second Permit Cycle (lbs)	Third Permit Cycle (lbs)	Total Estimated Reductions (lbs)
Nitrogen	66.1	463	793.9	1,323
Phosphorus	8.7	60.9	104.5	174.2
Total Suspended Solids	7,466.1	52,263	89,593.8	149,323

5. Means and Methods to Meet Required Reductions and Schedule

This section describes the means and methods by which the City will achieve the reduction required for source loads in existence as of June 30, 2009 as calculated in Section 4. The City has documented and will take credit for existing and planned reductions from redevelopment (Section 5.1) and City-initiated projects (Section 5.2). These reductions exceed the 5% required under the permit. In addition, the City reserves the right to take credit for additional reductions, which will be documented in the City's annual reports to DEQ. These include additional redevelopment and City-initiated projects, credit for street sweeping operations (Section 5.3), more stringent regulation of single family residential structures under one acre (Section 5.4), nutrient credit trading (Section 5.5), eligible stormwater management facilities installed between January 1, 2006 and June 30, 2009 (Section 5.6), and additional means and methods that may be implemented in accordance with DEQ's Chesapeake Bay TMDL Special Conditions Guidance (Section 5.7).

5.1 Redevelopment

In accordance with the Chesapeake Bay TMDL Special Condition Guidance (Part III.3.1) the City has documented credit for pollutant reductions from redevelopment regardless of the initial land cover condition of the site. This applies to any redevelopment project initiated on or after July 1, 2009. Twelve qualifying projects have been identified by the City, which are included in Appendix A.

For projects approved prior to July 1, 2014 (which includes all of the 12 projects), the City used the simple method to determine the amount of TP credit.³ For any portion of redevelopment that resulted in a direct impervious surface reduction, conversion factors from the MS4 permit⁴ were used to determine the equivalent credit for TN and TSS associated with the TP reduction. For the portion of redevelopment that resulted in a reduction due to a stormwater management facility, the methodology described in Appendix V.E of the DEQ guidance was utilized. Based on the DEQ guidance, the City calculated the proportion of the implemented facility's total reduction

³ DEQ's guidance requires that the simple method be used to calculate offsets required for new sources between July 1, 2009 and June 30, 2014. The guidance is silent on the methodology to use for redevelopment. Kelsey Brooks, DEQ, confirmed in a phone conversation on April 23, 2015 that the simple method could be used for redevelopment project prior to July 1, 2014 to maintain consistency with the method used at the time of redevelopment.

⁴ Table 4 of the City's MS4 permit.

that is available for credit toward the TMDL for TP. The City then determined the TN and TSS efficiency for the specific facility and took credit for the same proportion of the facility's total reductions for TN and TSS.

Table 5A – Summary of Reductions from Redevelopment

	Total Nitrogen Reduction (lbs)	Total Phosphorus Reduction (lbs)	Total Suspended Solids Reduction (lbs)
Total	73.76	31.33	6,405.49

5.2 City-Initiated Projects

The City has documented and will take credit for voluntary City-initiated stormwater management projects that have been completed or are under construction and will be completed prior to the end of the current permit cycle. This includes the City Hall Campus retrofit with a StormFilter (completed in 2014) and the Coe Branch and Pearson Branch stream restoration projects (expected to be completed no later than 2016). Information on these projects is included in Appendix B in a format consistent with the Chesapeake Bay TMDL Special Conditions Guidance.

Table 5B – Summary of Reductions from City-Initiated Projects

	Total Nitrogen Reduction (lbs)	Total Phosphorus Reduction (lbs)	Total Suspended Solids Reduction (lbs)
Implemented Reductions	0.79	12.84	120.48
Planned Reductions	100.2	90.85	59,959.68
Total Reductions	100.99	103.69	60,080.16

5.3 Street Sweeping

The City may take credit for its street sweeping program. Any credit taken will be documented in the City's annual reports to DEQ. In its MS4 Fiscal Year 2014 Annual Report, the City reported that it swept 201.4 tons of debris. The City anticipates maintaining this level of effort in the future. DEQ's Chesapeake Bay TMDL Special Conditions Guidance (Appendix V.G) provides the specific steps required for determining credit for street sweeping programs as well as efficiencies for reducing TN, TP, and TSS.



5.4 More Stringent Single Family Residential Development

The City has adopted stormwater quality requirements for single family residential development under one acre that are more stringent than the minimum VSMP requirements. While the Virginia Stormwater Management Regulations and the Chesapeake Bay Preservation Act regulate land disturbing activities 2,500 square feet and greater, localities may exempt single family residential development under one acre that are not part of a common plan of development. Chapter 35, Article I “Stormwater Management” City of Falls Church Code applies the 0.41 pounds of phosphorus per acre per year standard to single family residential development and redevelopment 2,500 square feet and greater. Based on correspondence with DEQ, the City will take credit for the difference between the pollutant load that could have been allowed for single family residential property under the state’s minimum water quality criteria and the pollutant load that was actually allowed for the property under the City’s more stringent requirements. Reductions achieved will be documented to DEQ in the City’s annual reports.

5.5 Nutrient Credit Trading

The City may take credit under nutrient credit trading programs authorized by the Code of Virginia. The City owns 2% of the efficiency of the Arlington Wastewater Treatment Plant. Likewise, the City has the option of purchasing off-site nutrient credits under the provisions of §62.1-44.15:35 of the Code of Virginia or taking credit for any off-site nutrient credit purchased by a private developer that exceeds the requirements of Chapter 35, Article I “Stormwater Management” City of Falls Church Code.

Any credits achieved through nutrient credit trading or through the use of off-site nutrient credits will be documented to DEQ in the City’s annual reports.

5.6 Stormwater Facilities Installed Between January 2006 and July 2009

In accordance with the Chesapeake Bay TMDL Special Condition Guidance (Part IV.2 and Appendix VI), the City may receive full credit for stormwater management facilities that were initially installed on or after January 1, 2006 and prior to July 1, 2009 within the regulated MS4 service area provided that the City has submitted a full account of stormwater facilities to DEQ as part of the “Historical Data Clean-Up” effort. Historical facility data must be submitted to DEQ by September 1, 2015 in order for the City to take credit for these facilities. The City will document any credit taken to DEQ in the City’s Fiscal Year 2016 annual report.⁵

5.7 Additional Means and Methods

The City reserves the right to implement and take credit for additional creditable facilities or practices as provided for in the Chesapeake Bay TMDL Special Condition Guidance. The guidance document specifically references the work of the Chesapeake Bay Urban Stormwater Workgroup, which includes credits for urban nutrient management and homeowner best management practices such as rainwater harvesting, downspout disconnection, permeable hard-scapes, tree planting, and impervious cover removal. Many of these practices are provided a

⁵ The City requested DEQ to confirm the timing for submittal of credits taken for facilities between 2006 and 2009 and whether they must be included in the initial Chesapeake Bay TMDL Action Plan. Jaime Bauer, DEQ, stated that the information could be provided to DEQ with the FY2016 annual report.

credit under the City's stormwater utility fee (see Section 9). Reductions achieved will be documented to DEQ in the City's annual reports.

5.8 Compliance Demonstration

Tables 5C through 5E demonstrate how the City will meet the required reductions from Section 4 for each POC with the means and methods described in Sections 5.1 through 5.8.

Table 5C – Compliance Demonstration for Total Nitrogen

Total Required Reductions (Table 4B)	Total Reductions Achieved (Table 5A, Table 5B, and Table 5C)	Total Reductions Remaining (lbs)	Percentage Target Achieved
66.1	174.75	-108.65	264%

Table 5D – Compliance Demonstration for Total Phosphorus

Total Required Reductions (Table 4B)	Total Reductions Achieved (Table 5A, Table 5B, and Table 5C)	Total Reductions Remaining (lbs)	Percentage Target Achieved
8.7	135.02	-126.32	1,552%

Table 5E – Compliance Demonstration for Total Suspended Solids

Total Required Reductions (Table 4B)	Total Reductions Achieved (Table 5A, Table 5B, and Table 5C)	Total Reductions Remaining (lbs)	Percentage Target Achieved
7,466.1	66,485.65	-59,019.55	891%

6. Means and Methods to Offset Increased Loads from New Sources Initiating Construction Between July 1, 2009 and June 30, 2014

The City must calculate any new POC loads between July 1, 2009 and June 30, 2014 that were due to water quality requirements less stringent than 16% impervious cover. The City must then achieve a 5% reduction in the new loads during this permit cycle.

Prior to July 1, 2014, development in low and medium residential zoning districts (R1A and R1B respectively, and for single family homes only) were capped at 35% impervious cover and were not required to implement water quality techniques provided that impervious cover was under the 35% threshold. For all other development, if the pre-development impervious cover was less than or equal to 50%, the post development load could be no greater than the pre-development load. If the pre-development impervious cover was greater than 50%, the post-development pollutant load must have been reduced by 10% from the pre-development pollutant load.

During the period of July 1, 2009 and June 30, 2014, 12 projects resulted in a land disturbance of one acre or greater. However, all projects resulted in a decrease in pollutant loads from pre-development conditions and are taken credit for in Section 5.1 (see projects listed in Appendix A). As a result, no offset is required.

7. Means and Methods to Offset Increased Loads from Grandfathered Projects Beginning Construction After July 1, 2014

The City must calculate new POC loads from grandfathered projects initiating construction after July 1, 2014 and disturbing one acre or greater. Unlike POCs from sources in Section 5 and Section 6, loads from grandfathered projects must be 100% offset prior to the completion of the project. The City has not identified any existing projects that meet this criteria and therefore no offset is required.

8. List of Future Projects Qualifying as Grandfathered

The City must list projects in addition to those listed in Section 7 that qualify as grandfathered in accordance with 9VAC25-870-48. No such projects have been identified for the City.

9. Estimated Cost of Compliance

Table 9A provides a summary of the estimated cost to implement projects in Section 5. These projects exceed the POC reduction requirements of this permit cycle.

Table 9A – Estimated Cost of Compliance

Strategy	Cost Explanation	Estimated Cost
Redevelopment	Private expense. No cost to the City.	\$0
City-Initiated Projects	City Hall retrofit project and Coe Branch and Pearson Branch stream restoration projects.	~\$3 million

The City Council has recognized the need for a stable source of revenue to meet long-term pollutant reduction targets and infrastructure maintenance obligations. As a result, the City adopted a Stormwater Utility Fee on April 22, 2013 in accordance with § 15.2-2114 of the Code of Virginia. The Stormwater Utility Fee is currently set at \$18 per 200 square feet of impervious cover. This rate will be continuously assessed by the City Council to ensure that it is adequate to meet the City's needs.

10. Public Comment Plan

The public comment process for the City of Falls Church Chesapeake Bay TMDL Action Plan included a work session of the City Council on July 27, 2015. The work session was followed by a public comment period that was announced in the City's Focus on Falls Church eNewsletter. The draft plan was also posted on the Town's web site.

Public comments are summarized in the table below and were taken into consideration in developing the final plan.

Table 10A – Public Comments

Appendix A

Redevelopment Projects

All calculations for pre-July 1, 2014 redevelopment are based on the simple method (“Chesapeake Bay Method”) contained in Chapter 4, Section III.b of the Northern Virginia BMP Handbook.

For any portion of a redevelopment project that resulted in a direct impervious surface reduction, Table 4 from the permit was used to determine the equivalent credit for TN and TSS associated with the TP reduction. For the portion of a redevelopment project that resulted in a reduction as a result of a stormwater management facility, the methodology described in Appendix V.E of the DEQ guidance was utilized.

Redevelopment Project	TN Credit	TP Credit	TSS Credit
Taco Bell - 935 West Broad Street	(2.85)	(0.33)	(371.72)
Falls Plaza - 1200 West Broad Street	(1.65)	(0.72)	(152.50)
Dominion Jewelers - 917 West Broad Street	(2.85)	(0.91)	(222.38)
Good Fortune at Eden Center - 6751 Wilson Blvd	(1.71)	(5.48)	(230.56)
Hilton - 706 West Broad Street	(0.06)	(1.01)	(7.57)
Northgate - 450 N. Washington Street	(10.12)	(2.76)	(871.45)
301 West Broad Street	(0.16)	(0.20)	(21.62)
BJ's Wholesale Club - 6607 Wilson Blvd	(27.20)	(10.75)	(2,237.63)
Easter Seals - 300 Hunton Avenue	(8.34)	(1.18)	(711.41)
The Reserve at Tinner Hill - 540-580 S. Washington Street	(0.54)	(2.42)	(75.05)
Thomas Jefferson Elementary - 601 South Oak Street	(14.10)	(2.05)	(1,202.99)
Cherry Street Child Development Center - 201 North Cherry Street	(4.18)	(3.53)	(300.60)
Total	(73.76)	(31.33)	(6,405.49)

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Taco Bell - 935 West Broad Street		
Information	Input	As Developed
Date	Jul-14	
Rainfall	40	
Site Area (SF)	35615	
Site Area (AC)		0.82
Watershed I %	50	
Pre-I Area (SF)	23168	
Pre-I Area (AC)		0.53
Pre-I Area (%)		65.05
Pre C Value	1.08	
Pre-TP Load		4.58
Post-I Area (SF)	22991	
Post-I Area (AC)		0.53
Post-I Area (%)		64.55
Post C Value	1.08	
Post-TP Load		4.55
Increase/Decrease		(0.03)
BMP 1	Contech CDS	
Efficiency	0.2	
I Area (AC)	0.17	
TP Removed		0.29
BMP 2	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		0.29
Total TP Decrease		(0.33)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(0.03)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(0.29)
Total Creditable TP Decrease			
Total Associated TN Load		6.9	31.37
TN Decrease from Impervious Reduction			(0.22)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.26	0.322091253	(2.63)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(2.63)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			
Total Associated TSS Load		469.2	2,133.23
TSS Decrease from Impervious Reduction			(15.12)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.519	0.322091253	(356.60)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(356.60)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. Contech CDS (ST), 0.007 AF Runoff Storage, 0.17 Acre Impervious Area, 0.49 Inch Runoff Treatment Depth.			

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Falls Plaza - 1200 West Broad Street						
Information	Input	As Developed				
Date	Sep-12					
Rainfall	40					
Site Area (SF)	28192					
Site Area (AC)		0.65				
Watershed I %	50					
Pre-I Area (SF)	24829.2					
Pre-I Area (AC)		0.57				
Pre-I Area (%)		88.07				
Pre C Value		1.08				
Pre-TP Load		4.81				
Post-I Area (SF)	24393.6					
Post-I Area (AC)		0.56				
Post-I Area (%)		86.53				
Post C Value		1.08				
Post-TP Load		4.73				
Increase/Decrease		(0.08)				
BMP 1	Permeable Pavers					
Efficiency	0.4					
I Area (AC)	0.02					
TP Removed		0.07				
BMP 2	Filtterra (4x6)					
Efficiency	0.5					
I Area (AC)	0.135					
TP Removed		0.57				
BMP 3	-					
Efficiency	0					
I Area (AC)	0					
TP Removed		0.00				
Total BMP TP Removed		0.64				
Total TP Decrease		(0.72)				

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(0.08)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(0.64)
Total Creditable TP Decrease			(0.72)
Total Associated TN Load	6.9		32.62
TN Decrease from Impervious Reduction			(0.55)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.591	0.035714286	(0.69)
BMP 2	0.053	0.241071429	(0.42)
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL			(1.11)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(1.65)
Total Associated TSS Load	469.2		2,217.83
TSS Decrease from Impervious Reduction			(37.21)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.74	0.035714286	(58.61)
BMP 2	0.106	0.241071429	(56.67)
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL			(115.29)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(152.50)

BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. Permeable pavers (RR), 0.0016 AF Runoff Storage, 0.02 Acre Impervious Area, 0.96 Inch Runoff Treatment Depth. 4x6 Filtterra (ST), 0.000812672 AF Runoff Storage, 0.135 Acre Impervious Area, 0.07 Inch Runoff Treatment Depth.			

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Dominion Jewelers - 917 West Broad Street							
Information	Input	As Developed					
Date	Jun-13						
Rainfall	40						
Site Area (SF)	24520						
Site Area (AC)		0.56					
Watershed I %	50						
Pre-I Area (SF)	20102						
Pre-I Area (AC)		0.46					
Pre-I Area (%)		81.98					
Pre C Value		1.08					
Pre-TP Load		3.91					
Post-I Area (SF)	18164						
Post-I Area (AC)		0.42					
Post-I Area (%)		74.08					
Post C Value		1.08					
Post-TP Load		3.56					
Increase/Decrease		(0.35)					
BMP 1	Filtrerra (4x6)						
Efficiency	0.65						
I Area (AC)	0.1						
TP Removed		0.55					
BMP 2							
Efficiency	0						
I Area (AC)	0						
TP Removed		0.00					
BMP 3	-						
Efficiency	0						
I Area (AC)	0						
TP Removed		0.00					
Total BMP TP Removed		0.55					
Total TP Decrease		(0.91)					

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(0.35)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(0.55)
Total Creditable TP Decrease			(0.91)
Total Associated TN Load	6.9		24.53
TN Decrease from Impervious Reduction			(2.43)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.071	0.239815019	(0.42)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL			(0.42)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(2.85)
Total Associated TSS Load	469.2		1,668.19
TSS Decrease from Impervious Reduction			(165.57)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.142	0.239815019	(56.81)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL			(56.81)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(222.38)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 4x6 Filterra (ST), 0.000812672 AF Runoff Storage, 0.1 Acre Impervious Area, 0.10 Inch Runoff Treatment Depth.			

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Good Fortune at Eden Center - 6751 Wilson Blvd		
Information	Input	As Developed
Date	Dec-14	
Rainfall	40	
Site Area (SF)	195295	
Site Area (AC)		4.48
Watershed I %	50	
Pre-I Area (SF)	175162	
Pre-I Area (AC)		4.02
Pre-I Area (%)		89.69
Pre C Value	1.08	
Pre-TP Load		33.87
Post-I Area (SF)	175137	
Post-I Area (AC)		4.02
Post-I Area (%)		89.68
Post C Value	1.08	
Post-TP Load		33.86
Increase/Decrease		(0.00)
BMP 1	StormFilter (6x8 w/ 6 27" Cartridges)	
Efficiency	0.5	
I Area (AC)	0.93	
TP Removed		3.92
BMP 2	Filterra (3 4x6)	
Efficiency	0.5	
I Area (AC)	0.37	
TP Removed		1.56
BMP 3	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		5.47
Total TP Decrease		(5.48)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(0.00)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(5.47)
Total Creditable TP Decrease			(5.48)
Total Associated TN Load		6.9	233.67
TN Decrease from Impervious Reduction			(0.03)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.008	0.231309204	(0.43)
BMP 2	0.058	0.092026242	(1.25)
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL			(1.68)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(1.71)
Total Associated TSS Load		469.2	15,889.44
TSS Decrease from Impervious Reduction			(2.14)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.016	0.231309204	(58.81)
BMP 2	0.116	0.092026242	(169.62)
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL			(228.43)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(230.56)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. BMP #1: 6x8 StormFilter w/ 6 27" Cartridges (ST), 0.00117539 AF Runoff Storage, 0.93 Acre Impervious Area, 0.02 Inch Runoff Treatment Depth. BMP #2: 3 4x6 Filterrras (ST), 0.002438017 AF Runoff Storage, 0.37 Acre Impervious Area, 0.08 Inch Runoff Treatment Depth.			

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Hilton - 706 West Broad Street		
Information	Input	As Developed
Date	Jul-14	
Rainfall	40	
Site Area (SF)	48739	
Site Area (AC)		1.12
Watershed I %	50	57.20
Pre-I Area (SF)	27878.4	
Pre-I Area (AC)		0.64
Pre-I Area (%)		57.20
Pre C Value	1.08	
Pre-TP Load		5.57
Post-I Area (SF)	40466	
Post-I Area (AC)		0.93
Post-I Area (%)		83.03
Post C Value	1.08	
Post-TP Load		7.86
Increase/Decrease		2.29
BMP 1	StormFilter (8x6 w/ 8 18" Cartridges)	
Efficiency	0.5	
I Area (AC)	0.78	
TP Removed		3.30
BMP 2		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		3.30
Total TP Decrease		(1.01)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	0.31		(1.01)
Total Creditable TP Decrease			(1.01)
Total Associated TN Load		6.9	54.24
TN Decrease from Impervious Reduction			-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.004	0.839638215	(0.18)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(0.06)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(0.06)
Total Associated TSS Load		469.2	3,688.47
TSS Decrease from Impervious Reduction			-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.008	0.839638215	(24.78)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(7.57)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(7.57)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 8x6 StormFilter w/8 18" Cartridges (ST), 0.000669192 AF Runoff Storage, 0.78 Acre Impervious Area, 0.01 Inch Runoff Treatment Depth.			

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Northgate - 450 N. Washington Street		
Information	Input	As Developed
Date	Dec-14	
Rainfall	40	
Site Area (SF)	66671	
Site Area (AC)		1.53
Watershed I %	50	
Pre-I Area (SF)	40536	
Pre-I Area (AC)		0.93
Pre-I Area (%)		60.80
Pre C Value	1.08	
Pre-TP Load		8.06
Post-I Area (SF)	57279	
Post-I Area (AC)		1.31
Post-I Area (%)		85.91
Post C Value	1.08	
Post-TP Load		11.10
Increase/Decrease		3.05
BMP 1	Green Roof	
Efficiency	0.4	
I Area (AC)	0.46	
TP Removed		1.55
BMP 2	StormFilter (8x4)	
Efficiency	0.5	
I Area (AC)	0.85	
TP Removed		3.59
BMP 3	Bioretention #1	
Efficiency	0.65	
I Area (AC)	0.06	
TP Removed		0.33
BMP 4	Bioretention #2	
Efficiency	0.5	
I Area (AC)	0.08	
TP Removed		0.34
Total BMP TP Removed		5.81
Total TP Decrease		(2.76)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	0.48		(2.76)
Total Creditable TP Decrease			(2.76)
Total Associated TN Load		6.9	76.62
TN Decrease from Impervious Reduction			-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.628	0.349824543	(16.83)
BMP 2	0.006	0.646414916	(0.30)
BMP 3	0.598	0.045629288	(2.09)
BMP 4	0.444	0.060839051	(2.07)
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL			(10.12)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(10.12)
Total Associated TSS Load		469.2	5,209.97
TSS Decrease from Impervious Reduction			-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.788	0.349824543	(1,436.19)
BMP 2	0.013	0.646414916	(43.78)
BMP 3	0.749	0.045629288	(178.06)
BMP 4	0.554	0.060839051	(175.60)
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL			(871.45)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(871.45)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. Green Roof (RR) 0.36 AF Runoff Storage, 0.35 Acre Impervious Area, 1.23 Inch Runoff Treatment Depth. 8x4 Cast-in-Place StormFilter (ST) 0.000918274 AF Runoff Storage, 0.85 Acre Impervious Area, 0.01 Inch Runoff Treatment Depth. Bioretention #1 Runoff Reduction Facility, 0.005 AF Runoff Storage, 0.06 Acre Impervious Area, 1.0 Inch Runoff Treatment Depth. Bioretention #2 Runoff Reduction Facility, 0.0045 AF Runoff Storage, 0.11 Acre Impervious Area, 0.49 Inch Runoff Treatment Depth.			

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301 West Broad Street		
Information	Input	As Developed
Date	Under Construction	
Rainfall		
Site Area (SF)	108028.8	
Site Area (AC)		2.48
Watershed I %	50	
Pre-I Area (SF)	89298	
Pre-I Area (AC)		2.05
Pre-I Area (%)		82.66
Pre C Value	1.08	
Pre-TP Load		17.35
Post-I Area (SF)	99752.4	
Post-I Area (AC)		2.29
Post-I Area (%)		92.34
Post C Value	1.08	
Post-TP Load		19.26
Increase/Decrease		1.90
BMP 1	StormFilter (8x6 w/ 8 27" Cartridges)	
Efficiency	0.5	
I Area (AC)	0.5	
TP Removed		2.10
BMP 2		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		2.10
Total TP Decrease		(0.20)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	0.09		(0.20)
Total Creditable TP Decrease			(0.20)
Total Associated TN Load		6.9	132.87
TN Decrease from Impervious Reduction			-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.058	0.218340611	(1.68)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(0.16)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(0.16)
Total Associated TSS Load		469.2	9,034.90
TSS Decrease from Impervious Reduction			-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.116	0.218340611	(228.83)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(21.62)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(21.62)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 8x6 StormFilter w/ 8 27" Cartridges (ST), 0.003305785 AF Runoff Storage, 0.5 Acre Impervious Area, 0.08 Inch Runoff Treatment Depth.			

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BJ's Wholesale Club - 6607 Wilson Blvd							
Information	Input	As Developed					
Date	Oct-10						
Rainfall	40						
Site Area (SF)	374616						
Site Area (AC)		8.60					
Watershed I %	50						
Pre-I Area (SF)	318859.2						
Pre-I Area (AC)		7.32					
Pre-I Area (%)		85.12					
Pre C Value		1.08					
Pre-TP Load		61.85					
Post-I Area (SF)	304484.4						
Post-I Area (AC)		6.99					
Post-I Area (%)		81.28					
Post C Value		1.08					
Post-TP Load		59.23					
Increase/Decrease		(2.62)					
BMP 1	Filterrras (5 4x6, 1 6x10, 1 4x8, 1 6x8)						
Efficiency	0.5						
I Area (AC)	1.62						
TP Removed		6.86					
BMP 2	Bioswale						
Efficiency	0.5						
I Area (AC)	0.3						
TP Removed		1.27					
BMP 3	-						
Efficiency	0						
I Area (AC)	0						
TP Removed		0.00					
Total BMP TP Removed		8.13					
Total TP Decrease		(10.75)					

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(2.62)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(8.13)
Total Creditable TP Decrease			(10.75)
Total Associated TN Load	6.9		408.69
TN Decrease from Impervious Reduction			(18.06)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.048	0.231759657	(4.55)
BMP 2	0.262	0.042918455	(4.60)
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(9.14)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(27.20)
Total Associated TSS Load	469.2		27,791.10
TSS Decrease from Impervious Reduction			(1,228.08)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.096	0.231759657	(618.32)
BMP 2	0.328	0.042918455	(391.22)
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(1,009.54)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(2,237.63)

BMP Efficiency Methodology Description:	
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 5 4x6, 1 6x10, 1 4x8, 1 6x8 Filterrras (ST), 0.008820018 AF Runoff Storage, 1.62 Acre Impervious Area, 0.07 Inch Runoff Treatment Depth. Bioswale (RR), 0.0058 AF Runoff Storage, 0.3 Acre Impervious Area, 0.23 Inch Runoff Treatment Depth.	

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Easter Seals - 300 Hunton Avenue		
Information	Input	As Developed
Date	Nov-13	
Rainfall	40	
Site Area (SF)	24679	
Site Area (AC)		0.57
Watershed I %	50	
Pre-I Area (SF)	15422	
Pre-I Area (AC)		0.35
Pre-I Area (%)		62.49
Pre C Value	1.08	
Pre-TP Load		3.06
Post-I Area (SF)	16324	
Post-I Area (AC)		0.37
Post-I Area (%)		66.15
Post C Value	1.08	
Post-TP Load		3.22
Increase/Decrease		0.16
BMP 1	Infiltration Trench A	
Efficiency	0.65	
I Area (AC)	0.1	
TP Removed		0.56
BMP 2	Infiltration Trench B	
Efficiency	0.5	
I Area (AC)	0.04	
TP Removed		0.17
BMP 3	Porous Concrete	
Efficiency	0.65	
I Area (AC)	0.11	
TP Removed		0.61
Total BMP TP Removed		1.35
Total TP Decrease		(1.18)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E		
TP Decrease for Impervious Reduction		-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)		
	0.88	(1.18)
Total Creditable TP Decrease		(1.18)
Total Associated TN Load	6.9	22.23
TN Decrease from Impervious Reduction		-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP
BMP 1	0.628	0.266846361 (3.73)
BMP 2	0.66	0.106738544 (1.57)
BMP 3	0.645	0.293530997 (4.21)
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(8.34)
Total Creditable TN Decrease (Imp. Reduction + BMPs)		(8.34)
Total Associated TSS Load	469.2	1,511.74
TSS Decrease from Impervious Reduction		-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP
BMP 1	0.788	0.266846361 (317.88)
BMP 2	0.827	0.106738544 (133.45)
BMP 3	0.809	0.293530997 (358.99)
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(711.41)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)		(711.41)
BMP Efficiency Methodology Description:		
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Infiltration Trench A (RR), 0.0103 AF Runoff Storage, 0.1 Acre Impervious Area, 1.23 Inch Runoff Treatment Depth. Infiltration Trench B (RR), 0.0056 AF Runoff Storage, 0.04 Acre Impervious Area, 1.68 Inch Runoff Treatment Depth. Porous Concrete (RR), 0.0131 AF Runoff Storage, 0.11 Acre Impervious Area, 1.43 Inch Runoff Treatment Depth.		

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The Reserve at Tinner Hill - 540-580 S. Washington Street		
Information	Input	As Developed
Date	Under Construction	
Rainfall		40
Site Area (SF)		97182
Site Area (AC)		2.23
Watershed I %	50	
Pre-I Area (SF)	81892.8	
Pre-I Area (AC)		1.88
Pre-I Area (%)		84.27
Pre C Value	1.08	
Pre-TP Load		15.89
Post-I Area (SF)	92782.8	
Post-I Area (AC)		2.13
Post-I Area (%)		95.47
Post C Value	1.08	
Post-TP Load		17.88
Increase/Decrease		1.98
BMP 1	StormFilter (12x6)	
Efficiency	0.5	
I Area (AC)	1.05	
TP Removed		4.41
BMP 2		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		4.41
Total TP Decrease		(2.42)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E		
TP Decrease for Impervious Reduction		-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)		
	0.55	(2.42)
Total Creditable TP Decrease		(2.42)
Total Associated TN Load	6.9	123.35
TN Decrease from Impervious Reduction		-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP
BMP 1	0.016	0.492957746
BMP 2		0
BMP 3		0
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(0.54)
Total Creditable TN Decrease (Imp. Reduction + BMPs)		(0.54)
Total Associated TSS Load	469.2	8,387.98
TSS Decrease from Impervious Reduction		-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP
BMP 1	0.033	0.492957746
BMP 2		0
BMP 3		0
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(75.05)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)		(75.05)
BMP Efficiency Methodology Description:		
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 12x6 StormFilter (ST), 0.002190083 AF Runoff Storage, 1.05 Acre Impervious Area, 0.03 Inch Runoff Treatment Depth.		

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Thomas Jefferson Elementary - 601 South Oak Street		
Information	Input	As Developed
Date	Sep-13	
Rainfall	40	
Site Area (SF)	287932	
Site Area (AC)	6.61	
Watershed I %	50	
Pre-I Area (SF)	89410	
Pre-I Area (AC)	2.05	
Pre-I Area (%)	31.05	
Pre C Value	1.08	
Pre-TP Load	19.19	
Post-I Area (SF)	98993	
Post-I Area (AC)	2.27	
Post-I Area (%)	34.38	
Post C Value	1.08	
Post-TP Load	20.94	
Increase/Decrease	1.74	
BMP 1	Open Joint Block Pavement	
Efficiency	0.4	
I Area (AC)	0.138406795	
TP Removed	0.51	
BMP 2	Bioretention #1	
Efficiency	0.65	
I Area (AC)	0.480004591	
TP Removed	2.87	
BMP 3	Bioretention #2	
Efficiency	0.65	
I Area (AC)	0.068870523	
TP Removed	0.41	
Total BMP TP Removed	3.80	
Total TP Decrease	(2.05)	

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	0.54	(2.05)	
Total Creditable TP Decrease		(2.05)	
Total Associated TN Load		6.9	144.47
TN Decrease from Impervious Reduction			
TN Decrease for BMPs		Efficiency	Proportion IA Treated by BMP
BMP 1	0.598	0.060903296	(5.26)
BMP 2	0.597	0.211216955	(18.22)
BMP 3	0.598	0.030305173	(2.62)
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(14.10)	
Total Creditable TN Decrease (Imp. Reduction + BMPs)		(14.10)	
Total Associated TSS Load		469.2	9,823.89
TSS Decrease from Impervious Reduction			
TSS Decrease for BMPs		Efficiency	Proportion IA Treated by BMP
BMP 1	0.75	0.060903296	(448.73)
BMP 2	0.749	0.211216955	(1,554.15)
BMP 3	0.749	0.030305173	(222.99)
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)		(1,202.99)	
Total Creditable TSS Decrease (Imp. Reduction + BMPs)		(1,202.99)	
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Block Pavement (RR), 0.012 AF Runoff Storage, 0.138 Acre Impervious Area, 1.01 Inch Runoff Treatment Depth. Bioretention #1 (RR), 0.040 AF Runoff Storage, 0.48 Acre Impervious Area, 1.0 Inch Runoff Treatment Depth. Bioretention #2 (RR), 0.006 AF Runoff Storage, 0.069 Acre Impervious Area, 1.0 Inch Runoff Treatment Depth.			

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Cherry Street Child Development Center - 201 North Cherry Street		
Information	Input	As Developed
Date	Under Construction	
Rainfall	40	
Site Area (SF)	62680	
Site Area (AC)		1.44
Watershed I %	50	
Pre-I Area (SF)	40071	
Pre-I Area (AC)		0.92
Pre-I Area (%)		63.93
Pre C Value	1.08	
Pre-TP Load		7.93
Post-I Area (SF)	36909	
Post-I Area (AC)		0.85
Post-I Area (%)		58.88
Post C Value	1.08	
Post-TP Load		7.35
Increase/Decrease		(0.58)
BMP 1	StormFilter (6x8 w/ 8 18" Cartridges)	
Efficiency	0.5	
I Area (AC)	0.68	
TP Removed		2.95
BMP 2		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3		
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		2.95
Total TP Decrease		(3.53)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			(0.58)
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(2.95)
Total Creditable TP Decrease			(3.53)
Total Associated TN Load		6.9	50.75
TN Decrease from Impervious Reduction			(3.97)
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.005	0.802535967	(0.20)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(0.20)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(4.18)
Total Associated TSS Load		469.2	3,450.75
TSS Decrease from Impervious Reduction			(270.14)
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.011	0.802535967	(30.46)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(30.46)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(300.60)
BMP Efficiency Methodology Description:			
TP efficiency from original development plan. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 6x8 StormFilter w/ 8 18" Cartridges (ST), 0.000669192 AF Runoff Storage, 0.68 Acre Impervious Area, 0.01 Inch Runoff Treatment Depth.			

Appendix B

City-Initiated Projects

Coe Branch Stream Restoration					
Anticipated Date Installed: 2016					
Latitude: 38.885071	HUC: PL26				
Longitude: -77.180056	Calculation Method: Interim/Default Rate				
Restoration Length (ft)	952.00				
STEP 1	TN	TP	TSS		
Impervious 5% Rate Reduction (lbs/ac/yr)	0.07587	0.01296	11.7132		
Pervious 5% Rate Reduction (lbs/ac/yr)	0.03021	0.00148625	0.769125		
Stream Restoration Interim Rates (lbs/ft)	0.075	0.068	44.88		
Total Reduction Based on Interim Rates (lbs)	71.40	64.74	42,725.76		
STEP 2	Total	Impervious	Forested	Pervious	Total Urban
Regulated Acres	130.35	68.60	-	61.75	130.35
Unregulated Acres	-	-	-	-	-
	130.35	68.60	-	61.75	130.35
STEP 3	Portion of Reductions (lbs/yr)				
	Land Ratio	TN	TP	TSS	
Regulated Urban	1.00	71.40	64.74	42,725.76	
Unregulated Urban	0.00	-	-	-	
Unregulated Forested	0.00	-	-	-	
STEP 4	TN	TP	TSS		
Required Baseline Reduction on Unregulated Impervious (lbs/yr)	-	-	-		
Required Baseline Reduction on Unregulated Pervious (lbs/yr)	-	-	-		
Total Required Baseline Reduction on Unregulated (lbs/yr)	-	-	-		
MS4 Credits	71.40	64.74	42,725.76		
Unregulated Urban Credits	-	-	-		
Unregulated Forested Credits	-	-	-		
Total Credits	71.40	64.74	42,725.76		

Coe Branch Degraded Stream Condition Documentation
Stantech, Pearson Branch and Coe Branch Stream Restoration Nutrient Reductions and
Crediting, April 16, 2016



Pearson Branch Stream Restoration					
Anticipated Installation Date: 2016					
Latitude: 38.887188		HUC: PL26			
Longitude: -77.184427		Calculation Method: Interim/Default Rate			
Restoration Length (ft)	384.00				
STEP 1	TN	TP	TSS		
Impervious 5% Rate Reduction (lbs/ac/yr)	0.07587	0.01296	11.7132		
Pervious 5% Rate Reduction (lbs/ac/yr)	0.03021	0.00148625	0.769125		
Stream Restoration Interim Rates (lbs/ft)	0.075	0.068	44.88		
Total Reduction Based on Interim Rates (lbs)	28.80	26.11	17,233.92		
STEP 2	Total	Impervious	Forested	Pervious	Total Urban
Regulated Acres	157.04	118.99	-	38.05	157.04
Unregulated Acres	-	-	-	-	-
	157.04	118.99	-	38.05	157.04
STEP 3	Portion of Reductions (lbs/yr)				
	Land Ratio	TN	TP	TSS	
Regulated Urban	1.00	28.80	26.11	17,233.92	
Unregulated Urban	0.00	-	-	-	
Unregulated Forested	0.00	-	-	-	
STEP 4	TN	TP	TSS		
Required Baseline Reduction on Unregulated Impervious (lbs/yr)	-	-	-		
Required Baseline Reduction on Unregulated Pervious (lbs/yr)	-	-	-		
Total Required Baseline Reduction on Unregulated (lbs/yr)	-	-	-		
MS4 Credits	28.80	26.11	17,233.92		
Unregulated Urban Credits	-	-	-		
Unregulated Forested Credits	-	-	-		
Total Credits	28.80	26.11	17,233.92		

Pearson Branch Degraded Stream Condition Documentation
Stantech, Pearson Branch and Coe Branch Stream Restoration Nutrient Reductions and
Crediting, April 16, 2016



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City Hall Storm Filter Retrofit - 300 Park Avenue		
Information	Input	As Developed
Date	Jun-14	
Rainfall	40	
Site Area (SF)	327135.6	
Site Area (AC)		7.51
Watershed I %	50	
Pre-I Area (SF)	138520.8	
Pre-I Area (AC)		3.18
Pre-I Area (%)		42.34
Pre C Value	1.08	
Pre-TP Load		28.53
Post-I Area (SF)	138520.8	
Post-I Area (AC)		3.18
Post-I Area (%)		42.34
Post C Value	1.08	
Post-TP Load		28.53
Increase/Decrease		-
BMP 1	Contech	
Efficiency	0.45	
I Area (AC)	3.18	
TP Removed		12.84
BMP 2	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
BMP 3	-	
Efficiency	0	
I Area (AC)	0	
TP Removed		0.00
Total BMP TP Removed		12.84
Total TP Decrease		(12.84)

Creditable Reductions for TN and TSS Per Guidance Appendix V.E			
TP Decrease for Impervious Reduction			-
TP Decrease for BMPs (Proportion of BMP Applied to TMDL Reduction)			
	1.00		(12.84)
Total Creditable TP Decrease			(12.84)
Total Associated TN Load		6.9	196.87
TN Decrease from Impervious Reduction			-
TN Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.004	1	(0.79)
BMP 2		0	-
BMP 3		0	-
TN Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(0.79)
Total Creditable TN Decrease (Imp. Reduction + BMPs)			(0.79)
Total Associated TSS Load		469.2	13,386.95
TSS Decrease from Impervious Reduction			-
TSS Decrease for BMPs	Efficiency	Proportion IA Treated by BMP	
BMP 1	0.009	1	(120.48)
BMP 2		0	-
BMP 3		0	-
TSS Decrease for BMPs (Decrease * Prop. Applied to TMDL)			(120.48)
Total Creditable TSS Decrease (Imp. Reduction + BMPs)			(120.48)
BMP Efficiency Methodology Description:			
TP efficiency = 45% based on Virginia Stormwater BMP Clearinghouse for Contech StormFilter with ZPG media. TN and TSS calculated using Chesapeake Bay Program Retrofit Equations. Runoff Storage for manufactured facilities provided by Contech. 8x14 Vault Style (81L) w/ 20-27" Cartridge StormFilter (ST), 0.002761708 AF Runoff Storage, 3.18 Acre Impervious Area, 0.01 Inch Runoff Treatment Depth.			

Appendix C

Reserved

